



Land Surface Imaging Constellation Study Team Report

21st CEOS Plenary

Agenda item: 9.3

Presented by: G. Bryan Bailey





LSI Constellation Objectives

- Fundamental Objectives
 - Define characteristics that describe optimal capabilities (and policies) that can become guidelines (or *standards*) in the development and operation of future LSI systems.
 - Address current and near-term problems and issues facing the land remote sensing community today.
 - working more cooperatively in the operation of existing systems.
 - realize tangible benefits to society through application of LSI data.
- 2007 Goals
 - Agree to cooperate in operating existing mid-resolution LSI systems.
 - Define preliminary standards for future mid-resolution LSI systems.
 - Contribute mid-resolution LSI data to the FRA2010 Project.



LSI Constellation Status

- Accomplishments
 - *Declaration of Intent for Cooperation on Mid-Resolution Satellite Systems* was signed by seven of eight agencies that operate such systems.
 - Additional agreements were drafted for review by the agencies to initiate cooperation related to data access, data acquisition, and ground systems.
 - Compiled user information requirements.
 - Developed preliminary *standards* for mid-resolution LSI systems.
 - Prepared a draft agreement to provide LSI data to the FRA2010 Project.
- Agency Contributions
 - CNES, CONAE, CSA, ESA, INPE, JAXA, NASA, NOAA, and NRSCC have members on the LSI Constellation Study Team, which is chaired by USGS and ISRO.
 - Contributions include advising, presenting papers, writing documents, etc.





LSI Constellation Next Steps

- Key Planned Activities
 - Participate in the Inaugural Meeting of the ISIS Working Group.
 - Present LSI Constellation overview to LDCM Science Team.
 - Hold Study Team meeting early in 2008.
 - Continue to work on unfinished tasks from 2007 Work Plan.
- Key Challenges
 - Dedicating sufficient personnel resources to accomplish the work.
 - Securing agency concurrence on documents approved by Study Team.
 - Fully engaging the land remote sensing user community.
 - Balancing agency agendas with common goals.
 - Managing expectations, such as what reasonably can be achieved and in what timeframe.



LSI Constellation Requested Support

- Need people to formulate and conduct LSI Constellation plans and activities.
 - Experienced and knowledgeable in science, technology, and applications of land remote sensing.
 - Able to devote meaningful time, energy, and expertise.
- Need the space agencies to view LSI Constellation activities as being important to their future and make supporting those activities a priority.
- Specifically, we request the space agencies to support the LSI Constellation with up to 0.2 FTE of time from one or more of their staff, and to provide their Study Team member funding to participate in two Study Team meetings per year.



LSI Constellation Connections to GEO



SBA	Science and Measurements	GEO 2007-2009 Work Plan	GEOSS 2-year Targets	GEOSS 6-year Targets	GEOSS 10-year Targets
Disaster	<p>Fires: fuels mapping, thermal mapping, recovery monitoring</p> <p>Volcanoes: deformation detection & monitoring; thermal monitoring</p> <p>Floods: topography; inundation monitoring</p> <p>General: pre-event conditions; post-event monitoring</p>	<p>DI-06-03: Integration of InSAR Technology</p> <p>DI-06-07: Multi-hazard Zonation and Maps</p> <p>DI-06-08: Multi-hazard Approach Definition and Progressive Implementation</p> <p>DI-06-09: Use of Satellites for Risk Management</p> <p>DI-06-13: Implementation of a Fire Warning System at Global Level</p> <p>DI-07-01: Risk Management for Floods</p>	<p>Strengthen International Charter.</p> <p>InSAR integration to disaster warning & prediction systems.</p>	<p>CEOS-assured continuity of critical observations.</p> <p>Explore Lidar/InSAR topography for low-relief & coastal zones.</p> <p>More automated satellite data processing systems for rapid hazard detection (oil spill, fires).</p>	<p>Address unmet needs: Significant increase in SAR (C/X/L); optimized L-band SAR for InSAR & forests; hyper-spectral for smoke & pollution plumes; passive microwave for soil moisture.</p> <p>Develop methods to determine shallow bathymetry (tsunami applications).</p>
Health	<p>Infectious Disease: land cover; topography; drainage basin flows</p> <p>Accidental Death & Injury: land cover; topography</p> <p>Birth Defects: land cover; topography</p>	<p>HE-06-03: Forecast Health Hazards</p> <p>HE-07-01: Strengthen Observation & Information Systems for Health</p> <p>HE-07-02: Environment & Health Monitoring and Modeling</p> <p>HE-07-03: Integrated Atmospheric Pollution Monitoring, Modeling & Forecasting</p>	<p>Define high-resolution sensors for health observations.</p> <p>Improve access to historical remote sensing data for health applications.</p> <p>Define observation & data requirements.</p>	<p>Derive wide-area health parameters from satellite.</p> <p>Specifications for major new observation capabilities.</p>	<p>Facilitate early detection and control of environmental risks.</p>
Energy	<p>Oil & Gas Exploration, Refining & Transport Operations, Renewable Energy & Plant Siting Operations., Biomass Crop Optimization : DEMs; land use/cover; geologic maps; urban extent; subsidence maps</p>	<p>EN-06-04: Using New Observation Systems for Energy</p> <p>EN-07-01: Management of Energy Sources</p> <p>EN-07-02: Energy Environmental Impact Monitoring</p> <p>EN-07-03: Energy Policy Planning</p>	<p>Develop strategic plan to use new generation systems.</p> <p>Exchange and use of data & products.</p>	<p>Exchange and use of data & products.</p>	<p>Implement operational observation system - reliable & timely data for energy sector.</p> <p>Exchange and use of data & products.</p>
Climate	<p>Understanding, Assessing and Predicting Climate Change: lake levels, snow cover, glaciers & ice caps, albedo, land cover, FAPAR, LAI, biomass, fire disturbance</p> <p>Mitigating Climate Change: fire disturbance, albedo biomass, land cover, FAPAR</p>	<p>CL-06-01: Sustained Reprocessing/ Reanalysis Efforts</p> <p>CL-06-02: Key Climate Data from Satellite Systems</p> <p>CL-06-03: Key Terrestrial Observations for Climate</p> <p>CL-06-05: GEOS IPY Contribution</p> <p>CL-07-01: Seamless Weather and Climate Prediction System</p>	<p>Implement GCOS-IP and IGOS Theme Reports.</p> <p>Emphasize importance of satellite observations for climate.</p> <p>Establish strong international coordination mechanisms.</p>	<p>Implement GCOS-IP and IGOS Theme Reports.</p> <p>Promote collaboration between observation and research organizations.</p> <p>Develop and operate new instruments for essential climate variable (ECVs).</p>	<p>Implement GCOS-IP and IGOS Theme Reports.</p> <p>Develop a long-term strategy for observation, data assimilation, and modeling.</p>





LSI Constellation Connections to GEO

SBA	Science and Measurements	GEO 2007-2009 Work Plan	GEOSS 2-year Targets	GEOSS 6-year Targets	GEOSS 10-year Targets
Water	<p>Water Flux & Storage Information: evapotranspiration; lake & reservoir extent/level; snow cover, glaciers, ice cap</p> <p>Radiation & Energy Budget: albedo; surface emissivity & temperature</p> <p>Other Information: topography, vegetation type; land use/land change</p>	<p>WA-06-02: Forecast Models for Drought & Water Resource Management</p> <p>WA-07-01: Global Water Quality Monitoring</p> <p>WA-07-02: Satellite Water Quantity Measurements & Integration with In-situ Data</p>	Collaborative mechanism between observations and research communities.	Collaborative mechanism between observations and research communities.	
Ecosystems	<p>Ecosystem Extent, Composition, Structure, & Function: habitat types; LAI; biomass; canopy</p> <p>Human Drivers: harvest intensity; lake eutrophic zones</p> <p>Disturbance: burned areas; pest & disease outbreaks; river discharge patterns</p>	<p>EC-06-01: Integrated Global Carbon Observation (IGCO)</p> <p>EC-06-02: Ecosystem Classification</p> <p>EC-06-07: Regional Networks for Ecosystems</p> <p>EC-07-01: Global Ecosystem Observation & Monitoring Network</p>	Implement IGOS Carbon observing system. Continuity of moderate to high-resolution EO satellites for land cover. Study new sensors and platforms.	Global ecosystem mapping at 500m resolution. Establish the role of satellite data in global farming systems database. Continuity of high-resolution imagery for monitoring logging in key biologically diverse regions.	Monitoring of urban ecosystems.
Agriculture	<p>Food Security: crop area; crop condition; crop yield</p> <p>Timber, Fuel, & Fiber: burned area, topography, forest area</p> <p>Grazing Systems: rangeland area; topography; land quality</p>	<p>AG-06-01: GEOSS Agriculture Strategic Plan</p> <p>AG-06-02: Data Utilization in Aquaculture</p> <p>AG-06-03: Forest Mapping & Monitoring</p> <p>AG-07-01: Improving Measurements of Biomass</p> <p>AG-07-02: Agriculture Risk Management</p> <p>AG-07-03: Operational Agricultural Monitoring System</p>	Land cover mapping of 1:1M. Establish basis for continuity of high-resolution optical and radar satellites.	Global land cover product at 1:500,000.	Global production capabilities: Land cover observations for 1:250,000; Land use observations for 1:500,000. Fully integrated observation system for on-time drought Early Warning System for food-insecure regions.
Biodiversity	<p>Conservation: location and area of ecosystems</p> <p>Invasive Species: vegetation type; vegetation stress; impact extent</p> <p>Natural Resources: land cover; topography; vegetation stress</p>	<p>BI-06-03: Capturing Historical Biodiversity Data</p> <p>BI-07-01: Biodiversity Observation Network</p> <p>BI-07-02: Invasive Species Monitoring System</p>	Develop observation strategies to support 2010 Convention on Biological Diversity (CBD) targets.		

